(12) **Patent:** (11) **CA 721719**

(54) WALL STRUCTURES

(54)

ABSTRACT:

CLAIMS: Show all claims

*** Note: Data on abstracts and claims is shown in the official language in which it was submitted.

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The present invention relates to wall structures and more particularly to resinous foam paper laminates which are uniquely adapted for use as water vapor barrier, insulating, plaster bases.

The use of gypsum plasterboard as a base for plaster has been of long duration. However, gypsum plasterboard has certain inherent objectionable features. For example, regular plasterboard is quite heavy so that the cost of shipping is a significant item. Also, regular plasterboard is brittle and must be handled with care, particularly when being applied to a stud wall. In addition, ordinary plasterboard has almost no resiliency so that ordinary settling of a building almost always results in plaster cracks in the plaster which is adhered to the plasterboard. These various disadvantages in the use of regular plasterboard have resulted in a substantial decrease in the use of plaster and a substantial increase in the use of dry wall construction. Various other means have been employed to overcome the disadvantages of plasterboard but with apparent marginal success.

It is therefore an object of this invention to prepare a particular composite laminate structure which can be plastered with ordinary plaster.

It is a further object to prepare a laminated structure which is characterized by a sheet of resinous foam having adhered to at least one surface thereof an absorbent paper adapted for tenacious bonding to plaster.

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It is still another object of this invention to prepare wall structures by applying plaster to the resinous foam laminates of this invention. These and other objects will be apparent from the following description.

The objects of this invention are accomplished by fabricating a water vapor barrier laminate adapted for use as a plaster base comprised of a resinous foam core having adhered to at least one side thereof an absorbent paper adapted for tenacious adherence to plaster. These resinous foam laminates can be attached to a bearing surface, such as a stud wall, in any conventional manner, such as nailing, and thereafter plastered in a conventional manner to provide a wall structure which provides insulation, a moisture vapor barrier, light weight, easy installation and sufficient resiliency to minimize plaster cracking.

The present invention may be more fully described in connection with the drawings wherein Fig. I is a cross-section of the resinous foam laminate; Fig. II is a cross-section of the resinous foam laminate having plaster adhered thereto and Fig. III is a cutaway view of the resinous foam laminate and plaster attached to a wall structure.

The laminate 10 may be prepared in any conventional manner. Such laminates are customarily prepared continuously by preparing a resinous foam layer and thereafter attaching one or more facing sheets by means of heat and pressure or by means of an adhesive. The exact methods will, of course, depend on the method of preparing the foam. Also, such laminates may be prepared by inter-foaming between facing sheets such as

described in U. S. Patents 2,764,516 and 2,744,042. Also the laminates of this invention may be prepared from expandable beads such as described in U. S. Patent 2,676,892. A particularly useful laminate may be prepared in accordance with the description contained in U.S. patent 3,149,020.

The laminate 10 is characterized by facing sheets 12 which are of a particular quality which makes them uniquely adapted to retaining plaster. In preparing the laminates of this invention, at least one surface of the foam layer must have this unique paper adhered thereto in order to provide a base for the plaster. The absorbent paper which is used in the preparation of the laminates of this invention must be readily adherable to the foam structure 14 and must be of a type of absorbent paper which will provide a suitable base for adhering plaster thereto. Such absorbent paper is characterized by a loose fibrous structure and may range in thickness from 10-50 mils, have a tensile strength of 25-125 pounds per inch and should weigh from .035-.075 pounds per square foot, all according to known standards for characterizing paper. A particularly useful paper is marketed by Bird & Son under the trade name Gyp-lath paper which is characterized by a tensile strength of 65-70 pounds per inch, a thickness of 20 mils and a weight of 62 pounds per 1000 square feet. This sized paper is made from used kraft and newsprint, the sizing being removed from at least one surface by an alkaline wash.

The prepared laminate 10 may be adhered to a bearing structure, such as a stud wall 28, by any conventional means. The cut-away section shown in Fig. III illustrates the plaster base laminates of this invention. The laminate 30 is attached to a stud wall 28 in such a

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manner that the outer surface of the laminate is a paper facing sheet. Base plaster 32 is adhered to the laminate and finish plaster 34 is adhered to the base plaster. The invention is further illustrated in Fig. II which is a cross-section of the laminate having plaster adhered thereto. The wall structure 16 is shown with the resinous foam laminates of this invention having absorbent paper layers tenaciously adhered to each surface of the foam. A base coat of plaster 22 is adhered to the resinous foam laminate and a finish coat 24 is adhered to the base coat.

In the preparation of the resinous foam laminates of this invention, any of the well known classes of resinous foams may be used. For example, alkyd resin foams as described in U. S. Patent 2,740,743, foamed polyurethanes as described in Polyurethanes, by Bernard Dombrow Rheinhold Publishing Company, 1957, rigid polyvinyl chloride foams, phenolic resin foams, epoxy foams, urea foams, etc. as described in Modern Plastics Encyclopedia, 1962 and polystyrene foams may be used in preparing the resinous foam laminates of this invention in accordance with customary practices. Useful resinous foams are further identified in the references noted in Applied Science and Technology Index, 1960, pages 1031 and 1032, etc.

Any of the well known classes of resinous foams may be covered with the unique absorbent paper described herein to provide the useful laminates of this invention. Only one side of the resinous foam cores must be covered with the absorbent paper although both sides may

be covered with the absorbent paper and a sandwich structure may be prepared by alternating layers of foam and paper if such a structure is desired for a particular application.

The thickness of the resinous foam cores are not critical and may range from very thin to relatively thick cores. Customarily, in practical application, the thickness of the resinous foam cores will range from 0.05 inch to 1.0 inch. However, resinous foam cores ranging from about 1/8 inch to 1/2 inch in thickness are most practical for most applications. The density of the resinous foam cores is not particularly critical but will customarily range from about 1-10 pounds per cubic foot. Particularly useful densities range from about 1.5-5 pounds per cubic foot.

The invention is best illustrated by an actual test panel wherein a resinous foam laminate was prepared by slitting a prefoamed polystyrene into a layer about 3/8 inch in thickness and thereafter applying to each side of the sheet of polystyrene sheets of absorbent paper about 1/32 inch thick by passing the layer of foamed polystyrene and paper sheets in adjacent relation between the platens of a laminating press maintained at a temperature of 425°F., a pressure of 10 psi, and a speed which provided a residence time on the platens of 10 seconds. Sections of laminate 4 feet by 4 feet in size, were nailed to a stud wall (2 x 4's on 16 inch centers) with regular blue lathing nails. Thereafter, a base coat of plaster about 2/8 inch thick was adhered to the outer absorbent paper layer in the conventional manner. The plaster was a mill mixed material comprised of perlite aggregate and

cement plaster, marketed by U. S. Gypsum as Structolyte. Thereafter, a white finish coat about 1/8 inch in thickness was adhered to the base coat of plaster in the conventional manner. The white finish coat of plaster was made from the conventional hydrated lime and gauging plaster.

Various additional adaptations of the present invention may be used without departing from the spirit and scope of the present invention.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:-

What is claimed is:

1. A vapor barrier laminate adapted for use as a plaster base comprised of a resinous foam core having adhered to at least one side thereof an absorbent paper adapted for tenacious adherence to plaster.

2. A vapor barrier laminate adapted for use as a plaster base comprised of a resinous foam core having adhered to at least one side thereof an absorbent paper adapted for tenacious adherence to plaster, said absorbent paper being characterized by a thickness of 10-50 mils, a tensile strength of 25-125 pounds per inch and a weight of .035-.075 pounds per square foot.

3. A composition according to claim 2 wherein the resinous foam core ranges in thickness from 0.05 inch to 1.0 inch and has a density of from 1-10 pounds per cubic foot.

4. A composition according to claim 3 wherein the resinous foam core is polystyrene foam.

5. A method of preparing a vapor barrier laminate adapted for use as a plaster base comprising (1) preparing a sheet of resinous foam and (2) adhering an absorbent paper adapted to tenaciously adhere plaster thereto to at least one side of the sheet of resinous foam.

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6. A method of preparing a vapor barrier laminate adapted for use as a plaster base comprising (1) preparing a sheet of resinous foam and (2) adhering an absorbent paper adapted to tenaciously adhere plaster thereto to at least one side of the sheet of resinous foam, the absorbent paper being characterized by a thickness of 10-50 mils, a tensile strength of 25-125 pounds per inch and a weight of .035-.075 pounds per square foot.

7. A method according to claim 6 wherein the resinous foam core ranges in thickness from 0.05 inch to 1.0 inch and has a density of from 1-10 pounds per cubic foot.

8. A method according to claim 7 wherein the resinous foam core is polystyrene.

9. A wall structure comprised of a vapor barrier laminate comprised of a resinous foam core having adhered to at least one side thereof an absorbent paper adapted for tenacious adherence to plaster and an outer layer of plaster tenaciously adhered to the facing sheet of absorbent paper.

10. A wall structure comprised of a vapor barrier laminate comprised of a resinous foam core having adhered to at least one side thereof an absorbent paper adapted for tenacious adherence to plaster and an outer layer of plaster tenaciously adhered to the facing sheet of absorbent paper, the absorbent paper facing sheet being characterized by a thickness of 10-50 mils, a tensile strength of 25-125 pounds per inch and a weight of .035-.075 pounds per square foot.

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11. A wall structure according t claim 9 wherein the resin us foam core ranges in thickness from 0.05 inch to 1.0 inch and has a density of from 1-10 pounds per cubic foot.

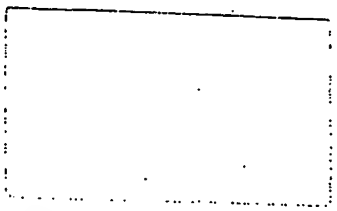
12. A wall structure according to claim 11 wherein the resinous foam core is polystyrene.

13. A method of preparing a wall structure comprising (1) attaching a vapor barrier laminate comprised of a resinous foam core having adhered to at least one side thereof an absorbent paper adapted for tenacious adherence to plaster to a bearing surface with the paper surface exposed and (2) applying plaster to the exposed laminate paper surface.

14. A method of preparing a wall structure comprising (1) attaching a vapor barrier laminate comprised of a resinous foam core having adhered to at least one side thereof an absorbent paper adapted for tenacious adherence to plaster to a bearing surface with the paper surface exposed and (2) applying plaster to the exposed laminate paper surface, the absorbent paper being characterized by a thickness of 10-15 mils, a tensile strength of 25-125 pounds per inch and a weight of .035-.075 pounds per square foot.

15. A method according to claim 13 wherein the resinous foam core ranges in thickness from 0.05 to 1.0 inch and has a density of from 1-10 pounds per cubic foot.

16. A method according to claim 15 wherein the resinous foam core is polystyrene.



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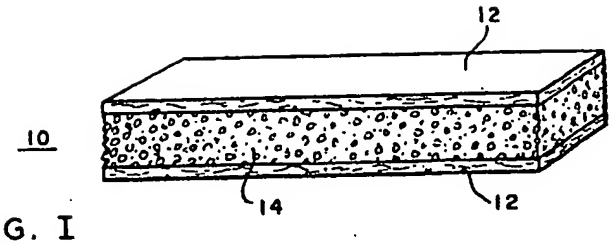

FIG. I

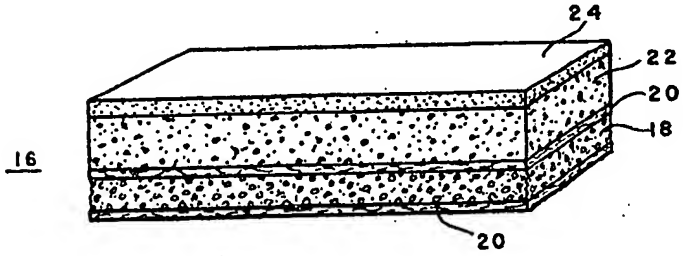

FIG. II

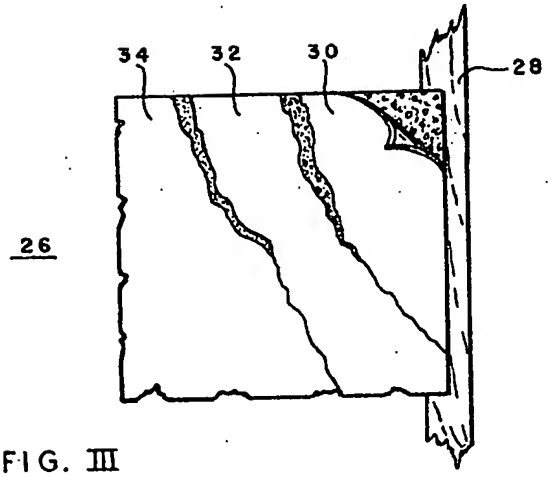

FIG. III

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